

Ground frozen.—Green Springs, Ala., 14th, 27th, 28th; Brookhaven, Miss., 14th, 15th, 27th; Eagle Pass, Tex., 7th.

PRECIPITATION.

On chart No. III is illustrated the general distribution of precipitation for the month. On the left side is a table showing a comparison of the present month with several previous Februarys, from which it will be seen that there has been a general deficiency, except in the Upper Lake region and Minnesota and on the Pacific coast; at Portland, Or., and Olympia, Wash. Ty., the excess has been nearly equal to the average February rainfall.

Special Heavy Rains.—3d and 4th, Wickenburg, Arizona, 2.14 inches. 11th, Smithville, N. C., 2.63; Fayetteville, N. C., 4.25 in. 16th and 17th, Chattanooga, 2.54; Fayetteville, N. C., 16th to 18th, 4.00 in. 22d, Okalooska, La., 2.40 in. 22d and 23d, Vicksburg, 2.15.

Largest Monthly Rainfalls.—Olympia, Wash. Ty., 15.59 inches; Portland, Or., 13.22; Fayetteville, N. C., 10.13; Mt. Washington, 7.01; White Plains, N. Y., 6.47; Gainesville, Ga., 6.18; Chattanooga, Tenn., 5.85; Vicksburg, 5.63; Knoxville, 5.61; Cape Hatteras, N. C., 5.09; San Francisco, 4.90; Smithville, N. C., 4.76; Cape Lookout, N. C., 4.68; Charleston, 4.56.

Smallest Monthly Rainfalls.—Jacksboro, Tex., none; Ft. Lyon, Col., 0.04 inches; Pilot, Tex., 0.05; Concho, Tex., 0.06; Dodge City, Kan., 0.08; Camp Verde and Florence, Arizona, 0.14; Vail, Ia., 0.15; Pioche, Nev., 0.17; Stockton, Tex., 0.18; Cheyenne and Ft. Hays, Kan., 0.20; Winnemucca, Nev., and Fort Sill, Ind. Ty., 0.21; Santa Fe, N. M., 0.23; Fort Snelling, Min., 0.24; Fort McPherson, Neb., 0.26; Castroville, Tex., 0.29; Visalia, Cal., Ft. Craig, N. M., Morristown, Dak., and Ft. Union, N. M., 0.30; Phoenix, Arizona, 0.34; Graham, Tex., 0.35; Ft. Fred Steele, Wy. Ty., and Yankton, Dak., 0.36; Denver, 0.39; Warrensburg, Mo., 0.13; Macon, Mo., 0.25; Phelps City, Mo., 0.22; Grand City, Mo., 0.20; and northwestern portion of Iowa generally less than 0.50.

Drought.—Uvalde, Tex., 26th—Sheep owners report this month the most severe known, many sheep and goats have died from cold and starvation; vegetation is backward and nearly all springs are dry.

Hail.—Ft. Fred. Steele, Wy. Ty., 15th; Morristown, Dak., 28th; New Bedford, Mass., 26th; Freehold, N. J., 25th, 26th; Flushing and Cape Vincent, N. Y., 26th; Wilmington, N. C., 8th, 18th; North Lewisburg, Ohio, 22d, 28th; Woodstock, Vt., 26th; Helvetia, W. Va., 11th; Boise City, Idaho, 14th; Ft. Sill, Ind. Ty., 14th; San Antonio, Tex., 23d; Castroville, Tex., 22d; Fredericksburg, Tex., 1st; Graham, Tex., 16th; Shreveport, La., 25th; Dubuque, Iowa, 24th; Logansport, Ind., 25th; Little Egg Harbor, N. J., 27th.

Rainy Days.—The number of days on which rain or snow has fallen varies as follows: New England, 13 to 17; Middle States, 7 to 16; South Carolina States, 9 to 13; Gulf States, 2 to 12; Ohio valley and Tennessee, 10 to 20; Lower Lake region, 15 to 23; Upper Lake region, 14 to 18; Upper Mississippi valley, 12 to 15; Lower Missouri valley, 4 to 11; Eastern Slope, 0 to 13; Rocky Mountains, 2 to 11; Western Plateau, 1 to 14; Pacific coast, 6 to 11.

Cloudy days.—For New England the number varies from 9 to 18; Middle States, 7 to 14; South Atlantic States, 7 to 13; Gulf States, 2 to 12; Ohio valley and Tennessee, 8 to 18; Lower Lake region, 13 to 21; Upper Lake region 9 to 17; Upper Mississippi valley, 8 to 13; Lower Missouri valley, 9 to 11; Eastern Slope, 5 to 14; Rocky Mountains, 2 to 10; Western Plateau, 1 to 17; Pacific coast, 4 to 11.

Snow.—The precipitation in the northern sections occurred generally as snow. On the Pacific coast and in the South Atlantic States and Texas it occurred as follows: in *British Columbia*, on the 7th, 8th, (10th, 11th, "heaviest storm since 1861-2, and came according to cloud movement, from the SW; at Victoria the snow was four to five feet deep.") *California*, on the Coast Range mountains, 19th; on Sierra Nevada's, during the entire month; *Texas*, 1st, 2d, 14th; *North Carolina*, 1st, 8th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 20th; *Georgia*, 14th, 16th.

Depth of Snow on Ground at end of Month.—It varied in the different sections as follows: *New England*, trace to 38 inches, and 48 inches on Mount Washington. *Middle States*, 0 to $\frac{1}{2}$ inch along the coast to 36 inches in the interior. *Ohio*, trace to 18 inches. *Lower Lakes*, 0 to 18 inches. *Upper Lakes*, 2 $\frac{1}{2}$ to 30 inches. *Upper Mississippi Valley*, trace to 25 inches. *Indiana*, 0 to 10 inches. *Red River of the North Valley*, 4 $\frac{1}{2}$ to 8 inches. *Missouri Valley*, 0 to 6 inches. *Rocky Mountains*, Cheyenne, Virginia City and Pike's Peak, 3 inches.

RELATIVE HUMIDITY.

The average percentage of relative humidity for the month ranges as follows: New England, 59 to 78; Middle States, 58 to 79; South Atlantic States, 57 to 78; East Gulf States, 69 to 76; West Gulf States, 56 to 77; Lower Lakes, 71 to 82; Upper Lakes, 70 to 78; Ohio valley and Tennessee, 59 to 73; Upper Mississippi valley, 66 to 74; Lower Missouri valley, 64 to 69; Red River of the North valley, 84; to 92; Eastern Slope, 50 to 91; Western Plateau, 48 to 67; California, 69 to 87. *High stations* report the following, not corrected for altitude: Mt. Washington, 85; Pike's Peak, 51; Santa Fe, 50; Cheyenne, 52; Denver, 57.

WINDS.

The prevailing winds at the Signal Service stations are shown by arrows on chart No. II, from an examination of which it will be seen that over the eastern section of the country they have been from northerly to westerly except where influenced by local causes; of which marked cases are seen in the NE. wind along

the North Carolina coast, the south wind at Burlington, Vt., and the east winds at Oswego and Grand Haven ; opposing northerly and southerly winds have prevailed from Texas to Colorado and thence to Arizona. Northerly winds in California and southerly winds from Oregon to Utah and thence northward.

Total Movements of the Air.—The following are the *largest* monthly movements recorded at the Signal Service stations, viz : Pike's Peak, 21,218 miles ; Sandy Hook, 13,101 ; Cape Lookout, 12,901 ; Cape May, 12,772 ; Woods Holl, 12,435 ; Indianola, 11,101 ; Barnegat, 10,161 ; Cape Hatteras, 10,095 ; Eastport, 9,722 ; Sandusky, 9,596 ; Cheyenne, 9,501 ; Breckenridge, 9,199 ; Milwaukee, 8,723 ; Grand Haven, 8,529. The *smallest* : Deadwood, Dak., 1,726 miles ; Visalia, Cal., 1,977 ; Nashville, 2,591 ; Los Angeles, Cal., 2,607 ; Walde, Tex., 2,635 ; Fredricksburg, Tex., 2,948 ; Indianapolis, 3,029 ; Lynchburg, 3,105 ; Ft. Craig, N. M., 3,178 ; San Diego, 3,294 ; Salt Lake City, 3,336 ; Ft. Davis, 3,429 ; Dubuque, 3,473 ; Augusta, 3,475 ; Shreveport, 3,500.

Local Storms.—Tornado at Riverdale, Caddo Parish, La. *February* 10th about 5 p. m. a black cloud resembling a water spout was observed moving from the SW. to SE. along the southern horizon apparently reaching to the ground and accompanied by thunder and lightning, hail and a terrible rumbling noise. The storm left a very clean path averaging about 100 yards in width, uprooting and in many places twisting off at the stump trees of from three to four feet in diameter. It prostrated at least 3,000 panels of fence, demolished two cabins carrying a portion of one of them across the river and scattering the remainder a distance of 100 yards. The tornado then crossed the river throwing the water to a great height. On the Sunny Point Plantation it blew a dwelling house off the blocks on which it rested, carrying it ten feet and setting flat on the ground. Cabins, dwelling and gin house damaged to the amount of \$1,000. The large gin house was twisted into two parts one of which was carried across the river on the Hamilton Plantation, and the other blown into the river. A new wagon was snatched up by the whirling storm and smashed into pieces ; a piece of hewn timber ten by sixteen inches and forty feet long was carried a quarter of a mile. On the Hamilton plantation two cabins were demolished and two persons injured, the storm then disappeared in the swamp.

VERIFICATIONS.

Indications.—The detailed comparison of the tri-daily weather Indications with the telegraphic reports for the succeeding twenty-four hours, show the general percentage of omissions to be 0.9 per cent., and of verifications to be 92.2 per cent. The percentage of verifications for the four elements have been : weather, 95.9 ; wind, 93.6 ; temperature, 91.9 ; barometer, 90.2. The percentage of verifications by geographical districts have been : New England, 93.8 ; Middle States, 94.1 ; South Atlantic States, 92.3 ; East Gulf States, 92.7 ; West Gulf States, 90.9 ; Lower Lake Region, 94.1 ; Upper Lake Region, 92.5 ; Tennessee and the Ohio Valley, 95.8 ; Upper Mississippi Valley, 92.1 ; Lower Missouri Valley, 91.4 ; Northern Pacific coast Region, 91.1 ; Central Pacific coast Region, 96.4 ; Southern Pacific coast Region, 83.9. Of the 3,437 predictions that have been made, 76 or 2.2 per cent. are considered to have entirely failed ; 52 or 1.5 cent. were one-fourth verified ; 237 or 6.9 per cent. were one-half verified ; 36 or 1.1 per cent. were three-fourths verified ; 3,036 or 88.3 per cent. were fully verified, so far as can be judged from the tri-daily weather maps.

Cautionary Signals.—143 Cautionary Signals were displayed, of which 135, or 94.4 per cent. were justified. 110 Cautionary Off-shore Signals were displayed, and of these 109 or 99.1 per cent. were justified as to direction ; 98 or 89.1 per cent. were justified as to velocity. Of the Cautionary Off-shore Signals, 72 were changed from Cautionary. 253 signals of both kinds were displayed, of which 233 or 92.1 per cent. were fully justified. The above does not include signals ordered at 45 display stations where the velocity is only estimated and not measured. 40 cases were reported of winds of 25 miles or over where signals were not ordered.

NAVIGATION.

In the table, on right side of chart No. III, are given the highest and lowest readings, on the Signal Service river-gauges, during the month with dates of same.

Ice on Rivers and Lakes. *Missouri.*—Omaha, 28th, river frozen during month, ice giving away along banks, teams have ceased to cross, but foot passengers cross daily with safety. Leavenworth, 7th, ice in river weakening ; 10th, ice gorge below city broke in the afternoon ; 11th, 26th, river full of floating ice. Brunswick, river has been frozen over since December 20th ; February 7th, ice began to move, melted gradually and caused no damage ; river closed seven miles above here. *Kansas River.*—Kansas City, Mo., 1st to 9th, floating ice ; 10th, river clear ; 14th, ice moving until 4 p. m., then closed ; 19th, river open ; 26th and 27th, floating ice ; 28th, river clear. *Magnaketa River.*—Monticello, Iowa, 1st, ice in river twenty-four inches thick. *Mississippi.*—Muscatine, Ia., 10th, 12th, 14th, teams crossing on the ice, this has continued for the past fifty days. Keokuk, 24th, ice above the bridge nearly all broken and heaping up along the shores ; ice south of the bridge yet solid. St. Louis, heavy ice in river 1st, 2nd, 12th, 13th, 15th to 18th, 27th ; light ice 3rd, 11th, 19th to 21st, 28th ; river clear, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 22nd to 26th ; 14th, river full of floating ice, navigation temporarily suspended ; 27th, heavy ice in river and running slowly ; 18th, navigation resumed. La Crosse, 28th, river frozen during month, teams crossing continually. St. Paul, river frozen during month, teams crossing every day. Cairo, 15th, 16th, 17th, floating ice in river. *Ohio.*—Wellsburg, West Va., 1st, navigation resumed ; 6th, large quantities of shore ice, river almost clear of floating ice ; 7th, clear of ice ; 15th to 18th, full of floating ice, navigation suspended ; 19th, full of floating ice, but steamers of the first class running ; 22nd, navigation suspended except to first